Laser cell photoelectric conversion efficiency

We have developed III-V-based high-efficiency laser power converters (LPCs), optimized specifically for converting monochromatic laser radiation at the eye ...

The lower photoelectric conversion efficiency (i blue light/input electronic power) from input electronic power to 420 nm light is probably responsible for this phenomenon, since the i blue light/input electronic power of the 420 nm chip used is not very high, ranging from 32.6% to 23.8% at 10-350 mA .

We have developed III-V-based high-efficiency laser power converters (LPCs), optimized specifically for converting monochromatic laser radiation at the eye-safe wavelength of 1.55 µm into electrical power.The applications of these photovoltaic cells include high-efficiency space-based and terrestrial laser power transfer and subsequent ...

The corresponding laser-to-electric conversion efficiency values are 1.37%, 1.60%, and 0.73%, respectively. Experimental results show that the electro-optic conversion efficiency of the laser and the photoelectric conversion efficiency of the photovoltaic receiver is the main reasons for the low conversion efficiency of the system.

Laser & Photonics Reviews is an interdisciplinary journal at the interface of photonics and optics publishing outstanding science for more than 15 years. ... achieving a photoelectric conversion efficiency of 3.8%. ... the photoelectric conversion efficiency of perovskite solar cells has surpassed that of polycrystalline silicon solar cells ...

Photoelectric conversion efficiency (PCE) is one of the crucial indicators to determine the overall performance of dye-sensitized solar cells (DSSCs), and accurate estimation of PCE is a feasible strategy for developing high ...

This study utilized the solar cell simulation software (SCAPS-1D) to explore strategies for enhancing the efficiency of lead-free perovskite solar cells and to elucidate the corresponding ...

The photoelectric conversion efficiency of InGaN/GaN multiple quantum well (MQW) solar cells has been investigated at high temperatures and the study revealed that their average value decreased from about 2.58% at room temperature to about 2.39% at a temperature of 500 °C. Atomic force microscopy (AFM) analysis indicated ...

Compared with other lasers, the semi-conductor laser has the highest efficiency of more than 50%, and the photoelectric conversion efficiency of GaAs PV cell can reach 45% at the laser wavelength of 808 nm. But it is not suitable for long-distance transmission because of the poor beam quality. Different from semiconductor lasers, ...

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Silicon solar cells have the advantages of non-toxicity, reliability, low price, and stability. Microlens arrays (MLAs) are widely used in solar cells to improve photoelectrical conversion efficiency (PCE). In this research, different MLAs mold was designed by a method of thermal reflow. Then the photoresist film MLAs structure was ...

Long-distance wireless energy transmission is realized by photoelectric conversion through lasers and photovoltaic cells. However, existing devices have low ...

The two batches of LPCs were tested under various 808 nm laser light intensities ranging from 100 to 2500 mW. The LPC structures with and without the ...

The Fraunhofer ISE research team achieved a conversion efficiency of 68.9% under monochromatic laser light with a new thin-film photovoltaic cell based on gallium arsenide. The Fraunhofer teams said the efficiency is a record for the conversion of light into electricity. Courtesy of Henning Helmers/Fraunhofer ISE.

2.1 High-Energy Density. Due to the rapid development of laser technology, laser is miniaturized and has high power. It can not only connect to the external conventional power grid to establish a fixed supply station in a suitable place, but also establish a flexible and mobile energy supply station by means of vehicle and airborne, ...

In order to reveal the degeneration mechanism of triple-junction solar cell under intense light radiation, an n -on -1 mode irradiation experiment utilizing a 1 070 nm CW laser as the intense ...

23 · The complexity further increases as the compositions of perovskite solar cells (PSCs) with demonstrated high power conversion efficiencies (PCEs) 3 are based on ...

The main goal of this work is to clearly answer the question from a theoretical perspective: how does graphene enhance the photoelectric conversion efficiency in the semiconducting layer of a ...

The loss of the LPT system mainly occurs in electrical-optical energy conversion of the LD, the propagation of the laser in the medium, the photoelectric conversion of the PV array, the process of laser passing through the optical subsystem, and the process of electrical energy passing through the power electronic converter.

The key indicator of the technological level of solar cells is the photoelectric conversion efficiency. Starting in 1954, the first monocrystalline silicon solar cell with an efficiency of 6% was ...

Technical advances in PSCs have led to several jumps in conversion efficiency. Miyasaka et al. 2 developed a PSC structure with an initial conversion efficiency of 3.8% that was then improved to 16.2%. 3 Their structure used methylammonium lead iodide (MAPbI 3)-based perovskite with an electron transfer layer ...

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A coupled optical-electronic approach and experimental study on a 3 mm-thick cell in 23 showed the possibility of enhanced light-absorption and conversion efficiency in patterned silicon cells as ...

In this work, photoelectric conversion efficiency (E ff) was defined as the maximum output power (P out) of the converter cell divided by the incident laser intensity (P in). Using the short-circuit current (I sc), open-circuit voltage (V oc), and fill factor (FF), E ff was also expressed as (I sc · V oc · FF)/P in. Each trial, the ...

The main goal of this work is to consider approaches to optimize InGaAs LPCs for converting monochromatic and laser energy from the range of l = 1-1.1 mm ...

The results can be explained by the equivalent circuit theory of a photovoltaic cell. Therefore, when the laser irradiation on the cells is complex, the photovoltaic conversion efficiency of ...

Scheme 1 shows the preparation process of the composite electron transport layer. According to the literature [21], ITO glasses were cleaned with ethanol and treated with UV-ozone for 15 min, and then SnCl 4 ·5H 2 O was dissolved in isopropanol to prepare a 0.05 M solution. The solution was stirred for 30 min, and spin-coated on ITO ...

Raising photoelectric conversion efficiency and enhancing heat management are two critical concerns for silicon-based solar cells. In this work, efficient Yb3+ infrared emissions from both quantum ...

Also, it should be stressed that conversion efficiency depends on the spectral distribution of the input radiation even if P r is kept constant. Therefore, IEC60904-3 standard defines the use of solar ...

In this paper, aiming at the application of laser energy transmission in space, the existing spatial laser energy transmission photoelectric conversion model is improved and the...

They always show special performance in spectral responsivity, compatibility and stability, which brought great challenges for the accurate measurement of photoelectric conversion efficiency. We will illustrate a method for accurate efficiency measurement mainly in the view of metrology.

The parameter optimization of LPCs based on the In x Ga 1-x As MM structure has led to achieving a laser conversion efficiency (l = 1064 nm) of more than 50% with an incident power of 3.2-6.5 W/sm 2 while maintaining an efficiency of more than 48% up to 13 W/cm 2. The results have been demonstrated for both uniform ...

The daily average photoelectric conversion efficiency was 6.68%. The reason for the relatively low photoelectric conversion efficiency was that first, the photovoltaic panels used in this experiment were slender

strips and some losses were caused by the cutting, welding and packaging of photovoltaic panels; second, the ...

Without changing any existing structure in the ready-made solar cell, this facile and efficient method has huge applications. To the best of our knowledge, this paper is the first report on nano Ag-enhanced photoelectric conversion efficiency in this kind of CsPbIBr 2 perovskite solar cell.